

CLAIMS:

1. A slot mechanism having an accommodation space into which an insertion object is inserted through a slot, the slot  
5 mechanism comprising:

a shutter holder provided in the accommodation space, wherein the shutter holder is movable between a first position and a second position along an insertion direction in which the insertion object is inserted into the accommodation space,  
10 and wherein the second position is closer to a bottom of the accommodation space than the first position;

a shutter provided in a shutter space defined in the shutter holder, wherein the shutter is movable relative to the shutter holder and between a third position and a fourth  
15 position along the insertion direction, wherein the fourth position is closer to a bottom of the shutter space than the third position, wherein, when the insertion object is inserted into the accommodation space, the shutter is pressed by the insertion object and is moved to the fourth position, wherein  
20 the shutter holder is pressed by the shutter moved to the fourth position and is moved to the second position, wherein, when the insertion object is pulled out of the accommodation space, the shutter holder moves to the first position, and the shutter moves to the third position, so that the slot is  
25 closed by the shutter;

an insertion object locking mechanism, wherein the locking mechanism locks the insertion object to the shutter holder when the shutter is moved to the fourth position by the insertion object; and

30 a holder retaining mechanism, wherein the holder retaining mechanism holds the shutter holder at the second position when the shutter holder is moved to the second position by the shutter.

35 2. The slot mechanism according to claim 1, wherein, when

the shutter holder receives a force that greater than a predetermined value and is directed from the second position to the first position, the retaining mechanism releases the shutter holder.

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3. The slot mechanism according to claim 1, wherein the insertion object locking mechanism includes a locking piece that is movable with movement of the shutter holder, wherein, when the shutter is moved to the fourth position by the  
10 insertion object, and the shutter holder is moved to the second position by the shutter, the locking piece projects into the shutter space to engage with the insertion object.

4. The slot mechanism according to claim 3, further  
15 comprising a sidewall that faces the shutter holder with respect to a direction perpendicular to the insertion direction and defines the accommodation space, wherein the locking piece is urged toward the sidewall, wherein a step is formed in the sidewall, and wherein, when the shutter holder  
20 is moved from the first position to the second position, the step guides the locking piece to project into the shutter space.

5. The slot mechanism according to claim 1, further  
25 comprising a sidewall that faces the shutter holder with respect to a direction perpendicular to the insertion direction and defines the accommodation space, wherein the holder retaining mechanism includes an engaging recess formed in the sidewall and an engaging member provided in the shutter  
30 holder, wherein the engaging member has a projection projecting toward the sidewall, and wherein, when the shutter holder is moved to the second position by the shutter, the projection engages with the engaging recess.

35 6. The slot mechanism according to claim 5, wherein the

holder retaining mechanism further includes a pressing member that presses the projection toward the sidewall, and wherein a force by which the pressing member presses the projection changes according to the position of the shutter relative to the shutter holder.

7. The slot mechanism according to claim 6, wherein the engaging member is rotatably supported by the shutter holder, and wherein the pressing member is provided in the shutter.

8. The slot mechanism according to claim 1, further comprising a holder locking mechanism, wherein the holder locking mechanism locks the shutter holder by a force greater than the retaining force of the holder retaining mechanism when the shutter holder is at the second position.

9. The slot mechanism according to claim 8, wherein the holder locking mechanism includes a holder locking member and a solenoid, wherein the holder locking member is provided in the shutter holder and has an engaging portion, and the solenoid has a plunger, and wherein, when the plunger is engaged with the engaging portion, the shutter holder is locked.

10. The slot mechanism according to claim 1, further comprising an elastic member for the shutter holder and an elastic member for the shutter, wherein the holder elastic member urges the shutter holder from the second position to the first position, and wherein the shutter elastic member urges the shutter from the fourth position to the third position.

11. A smart ignition system, comprising:  
a portable device;

a slot mechanism having an accommodation space into which

the portable device is inserted through a slot;

a detection portion for detecting insertion of the portable device into the accommodation space; and

a verification portion for determining whether the inserted portable device is a correct portable device;

wherein the slot mechanism includes:

a shutter holder provided in the accommodation space, wherein the shutter holder is movable between a first position and a second position along a direction in which the portable device is inserted into the accommodation space, and wherein the second position is closer to a bottom of the accommodation space than the first position;

a shutter provided in a shutter space defined in the shutter holder, wherein the shutter is movable relative to the shutter holder and between a third position and a fourth position along the insertion direction, wherein the fourth position is closer to a bottom of the shutter space than the third position, wherein, when the portable device is inserted into the accommodation space, the shutter is pressed by the portable device and is moved to the fourth position, wherein the shutter holder is pressed by the shutter moved to the fourth position and is moved to the second position, wherein, when the portable device is pulled out of the accommodation space, the shutter holder moves to the first position, and the shutter moves to the third position, so that the slot is closed by the shutter;

a portable device locking mechanism, wherein the locking mechanism locks the portable device to the shutter holder when the shutter is moved to the fourth position by the portable device; and

a holder retaining mechanism, wherein the holder retaining mechanism holds the shutter holder at the second position when the shutter holder is moved to the second position by the shutter.

12. The smart ignition system according to claim 11,  
further comprising a holder locking mechanism, wherein, only  
when the inserted portable device is determined to be a  
correct portable device, the holder locking mechanism locks  
5 the shutter holder by a force greater than the retaining force  
of the holder retaining mechanism when the shutter holder is  
at the second position.

13. The smart ignition system according to claim 11,  
10 wherein the detection portion is a switch that is turned on  
when the shutter holder reaches the second position, and  
wherein the verification portion performs the determination  
after the switch is turned on.

14. The smart ignition system according to claim 11,  
15 wherein the portable device transmits a signal containing a  
unique ID code to the verification portion, and wherein the  
verification portion determines whether the ID code contained  
in the received signal is an ID code given to the correct  
20 portable device.

15. The smart ignition system according to claim 14,  
wherein the portable device includes a transponder, wherein,  
when the portable device is inserted in the accommodation  
25 space, the transponder outputs a transponder signal containing  
the ID code by receiving electromagnetic waves generated by  
the slot mechanism.

16. A slot mechanism for receiving an insertion object,  
30 comprising:

a case that has a slot and defines an accommodation space  
into which the insertion object is inserted through the slot;

a shutter holder provided in the accommodation space,  
wherein the shutter holder is movable between a first position  
35 and a second position along a direction in which the insertion

object is inserted into the accommodation space, wherein the second position is closer to a bottom of the accommodation space than the first position;

5 a holder urging member for urging the shutter holder from the second position to the first position;

a shutter provided in a shutter space defined in the shutter holder, wherein the shutter is movable relative to the shutter holder and between a third position and a fourth position along the insertion direction, wherein the fourth  
10 position is closer to a bottom of the shutter space than the third position, wherein, when the insertion object is inserted into the accommodation space through the slot, the shutter is pressed by the insertion object and is moved to the fourth position, wherein the shutter holder is pressed by the shutter  
15 moved to the fourth position and is moved to the second position;

a shutter urging member for urging the shutter from the fourth position to the third position by a force weaker than that of the holder urging member;

20 an insertion object locking mechanism, wherein the locking mechanism locks the insertion object to the shutter holder when the shutter is moved to the fourth position by the insertion object; and

a holder retaining mechanism, wherein the holder  
25 retaining mechanism holds the shutter holder at the second position when the shutter holder is moved to the second position by the shutter.

17. The slot mechanism according to claim 16, wherein,  
30 when the shutter holder receives a force that greater than a predetermined value and is directed from the second position to the first position, the retaining mechanism releases the shutter holder.

35 18. The slot mechanism according to claim 16, wherein the

insertion object locking mechanism includes a locking piece that is movable with movement of the shutter holder, wherein, when the shutter is moved to the fourth position by the insertion object, and the shutter holder is moved to the second position by the shutter, the locking piece projects into the shutter space to engage with the insertion object.

19. The slot mechanism according to claim 16, further comprising a sidewall that faces the shutter holder with respect to a direction perpendicular to the insertion direction and defines the accommodation space, wherein the holder retaining mechanism includes an engaging recess formed in the sidewall and an engaging member provided in the shutter holder, wherein the engaging member has a projection projecting toward the sidewall, and wherein, when the shutter holder is moved to the second position by the shutter, the projection engages with the engaging recess.

20. The slot mechanism according to claim 16, further comprising a holder locking mechanism, wherein the holder locking mechanism locks the shutter holder by a force greater than the retaining force of the holder retaining mechanism when the shutter holder is at the second position.